No exact quantitative analyses were attempted by the author, the comparative experiments having been performed on small portions only of serum (from 25 to 40 grains); sufficiently large, however, to furnish satisfactory evidence of the actual presence of the phosphate in arterial blood, and also in those portions of venous blood which had been arterialized out of the body; while no such indications were obtained from similar portions of the blood contained in the veins.

At the conclusion of the paper, the author notices the experiments of Enderlin, in which no alkaline carbonate could be detected in the ashes of blood; and shows that this is the natural consequence of the phosphates of the clot being oxidized during combustion, and thus supplying a quantity of phosphoric acid sufficient to decompose completely the alkaline carbonate produced by the incineration of the lactate and albuminate of the serum. Most specimens of serum, even as obtained from arterial blood, yield an alkaline carbonate when incinerated; and this is always the case with the serum of venous blood. The author, therefore, thinks himself warranted in regarding the conclusion founded on Enderlin's experiments, that the blood contains no lactate, as being erroneous.

June 17, 1847.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

1. "Electro-Physiological Researches, 5th, 6th, and 7th Series." By Signor Carlo Matteucci, Professor in the University of Pisa. Communicated by Michael Faraday, Esq., D.C.L., F.R.S., &c.

The fifth series of these researches contains the sequel of the author's investigations of *induced contractions*, which, in his third memoir, published in the Philosophical Transactions for 1845, he had considered as being due to nervous influence acting through the muscles during their contraction, and was therefore referable to a kind of nervous induction, and not to the generation of any electric current by muscular contraction. From the experiments related in the present paper, he is led to the conclusion that the phenomena of induced contraction belong exclusively to the muscle in the state of contraction. He now, however, finds reason for doubting that the fact is established that induced contractions are not due to an electric discharge produced during the contraction of the muscle.

The second section of this memoir relates to the phenomena elicited by the passage of the electric current through the nerves of a living animal, or of one recently killed, according to the direction of the current. He finds that in whatever manner the current passing through the nerve of the inverse limb is arrested, tetanic contraction is excited. In order to produce this effect, it is sufficient to moisten the nerve with a large drop of water, or to double it

back upon itself. Phenomena perfectly analogous to those observed in frogs, may be produced in warm-blooded animals, by the action of inverse currents; they continue, however, for a much shorter time, especially if the vitality of the animal is very great. These phenomena clearly belong to the nerve, and have their origin in the relation, the nature of which is yet undetermined, which exists between nervous influence and the action of the electric current according to the direction of that current. Thus a limb traversed by the direct current may be compared to a limb fatigued by repeated efforts; the inverse current may be supposed to act in an opposite manner, and during its passage, the nervous force may accumulate in the nerve. The facts here recorded may establish a fresh connection between nervous influence and the passage of the electric current according to its direction.

The sixth series treats of the laws of the electric discharge of the Torpedo and other electrical fishes, and of the theory of the production of electricity in these animals. Irritations applied to any point of the body of an electrical fish are transmitted by the nerves to the fourth lobe of the brain, and are then followed by the electric discharge: the nervous action by which this discharge is determined under the influence of the will resides in that fourth, or *electrical lobe* of the brain; for after the three superior cerebral lobes have been removed, the torpedo can still give the shock, either voluntarily, or by external irritations. The separation of the two electricities which takes place in the cells of the electrical organ, under nervous influence, are instantaneously reunited by the discharge. The strength of the current obtained during the discharge is proportional to the length of the cellular prisms included in the closed circuit. The author concludes that the nervous force increases independently of the will with every increase in the activity of the functions of circulation and of respiration, and of every act of nutrition, and also under the influence of certain agents introduced into the system.

The seventh and last series treats of the relation that exists between the intensity of the electric current and that of the corresponding physiological effect. A detailed account is given of the apparatus employed, and of the method of experimenting, which the author had recourse to in his researches on this branch of the subject. The amount of the contractions produced in muscles under different circumstances of electric excitation is stated in a table which closes the paper.

2. "On different properties of Solar Radiation, producing or preventing a deposit of Mercury on Silver Plates coated with Iodine, or its compounds with Bromine or Chlorine, modified by coloured glass media and the vapours of the atmosphere." By A. C. Claudet. Communicated by Sir David Brewster, K.H., D.C.L., F.R.S., &c.

At an early period of the study of photography, it was observed that the red, orange and yellow rays are endowed with antagonistic powers, preventing and destroying the action produced by white